UNIT TERMINAL OBJECTIVE

1-4 At the completion of this unit, the EMT-Intermediate student will be able to safely and precisely access the venous circulation and administer medications.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 1-4.1 Review the specific anatomy and physiology pertinent to medication administration. (C-1)
- 1-4.2 Review mathematical principles. (C-1)
- 1-4.3 Review mathematical equivalents. (C-1)
- 1-4.4 Differentiate temperature readings between the Centigrade and Fahrenheit scales. (C-3)
- 1-4.5 Discuss formulas as a basis for performing drug calculations. (C-1)
- 1-4.6 Calculate oral and parenteral drug dosages for all emergency medications administered to adults, infants and children. (C-2)
- 1-4.7 Calculate intravenous infusion rates for adults, infants, and children. (C-2)
- 1-4.8 Discuss legal aspects affecting medication administration. (C-1)
- 1-4.9 Discuss the "six rights" of drug administration and correlate these with the principles of medication administration. (C-1)
- 1-4.10 Discuss medical asepsis and the differences between clean and sterile techniques. (C-1)
- 1-4.11 Describe use of antiseptics and disinfectants. (C-1)
- 1-4.12 Describe the use of universal precautions and body substance isolation (BSI) procedures when administering a medication. (C-1)
- 1-4.13 Describe the indications, equipment needed, techniques utilized, precautions, and general principles of peripheral venous cannulation. (C-1)
- 1-4.14 Describe the indications, equipment needed, techniques utilized, precautions, and general principles of intraosseous needle placement and infusion. (C-1)
- 1-4.15 Describe the indications, equipment needed, techniques utilized, precautions, and general principles of administering medications by the inhalation route. (C-3)
- 1-4.16 Differentiate among the different dosage forms of oral medications. (C-3)
- 1-4.17 Describe the equipment needed and general principles of administering oral medications. (C-3)
- 1-4.18 Describe the indications, equipment needed, techniques utilized, precautions, and general principles of rectal medication administration. (C-3)
- 1-4.19 Differentiate among the different parenteral routes of medication administration. (C-3)
- 1-4.20 Describe the equipment needed, techniques utilized, complications, and general principles for the preparation and administration of parenteral medications. (C-1)
- 1-4.21 Differentiate among the different percutaneous routes of medication administration. (C-3)
- 1-4.22 Describe the purpose, equipment needed, techniques utilized, complications, and general principles for obtaining a blood sample. (C-1)
- 1-4.23 Describe disposal of contaminated items and sharps. (C-1)
- 1-4.24 Synthesize a pharmacologic management plan including medication administration. (C-3)
- 1-4.25 Integrate pathophysiological principles of medication administration with patient management. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 1-4.26 Comply with EMT-Intermediate standards of medication administration. (A-1)
- 1-4.27 Comply with universal precautions and body substance isolation (BSI). (A-1)
- 1-4.28 Defend a pharmacologic management plan for medication administration. (A-3)
- 1-4.29 Serve as a model for medical asepsis. (A-3)
- 1-4.30 Serve as a model for advocacy while performing medication administration. (A-3)

United States Department of Transportation

National Highway Traffic Safety Administration

EMT-Intermediate: National Standard Curriculum

Venous Access and Medication Administration: 4

1-4.31 Serve as a model for disposing of contaminated items and sharps. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 1-4.32 Use universal precautions and body substance isolation (BSI) procedures during medication administration. (P-2)
- 1-4.33 Demonstrate cannulation of peripheral veins. (P-2)
- 1-4.34 Demonstrate intraosseous needle placement and infusion. (P-2)
- 1-4.35 Demonstrate clean technique during medication administration. (P-3)
- 1-4.36 Demonstrate administration of medications by the inhalation route. (P-2)
- 1-4.37 Demonstrate administration of oral medications. (P-2)
- 1-4.38 Demonstrate rectal administration of medications. (P-2)
- 1-4.39 Demonstrate preparation and administration of parenteral medications. (P-2)
- 1-4.40 Demonstrate preparation and techniques for obtaining a blood sample. (P-2)
- 1-4.41 Perfect disposal of contaminated items and sharps. (P-3)

DECLARATIVE

- I. Review of mathematical principles
 - A. Multiplication and division
 - B. Roman numerals
 - C. Fractions
 - D. Decimal fractions
 - E. Proportions
 - F. Percent
- II. Mathematical equivalents used in pharmacology
 - A. The metric system
 - B. Fahrenheit scale for temperature reading
 - C. Celsius (centigrade) scale for temperature reading
 - D. Converting between Fahrenheit and Celsius temperatures
- III. Calculating drug dosages
 - A. Calculation methods
 - 1. Fraction method
 - 2. Ratio method
 - 3. Desired dose over available concentration method
 - B. Calculating dosages
 - 1. Oral medications
 - a. Capsules and tablets
 - b. Liquids
 - 2. Parenteral medications
 - a. Quantity (typically weight)
 - b. Volume
 - c. Units (i.e. insulin)
 - 3. Intravenous infusions
 - a. Flow rates
 - b. Flow rates for infants and children
 - 4. Calculating dosages for infants and children
 - a. Body weight
 - b. Use of tables, charts, and other adjuncts
 - c. Length-based resuscitation tapes
- IV. Medical direction
 - A. Medication administration is bound by the EMT-Intermediate's on-line or off-line medical direction
 - B. Role of the medical director
 - C. Patient management protocols
 - 1. Written standing orders
 - D. Legal considerations policies and procedures which specify regulations of medication administration
- V. Principles of medication administration
 - A. Local drug distribution system policies which establish stocking and supply of drugs
 - B. EMT-Intermediate's responsibility associated with the drug order
 - 1. Verification of the drug order
 - C. The "six rights" of medication administration

United States Department of Transportation

National Highway Traffic Safety Administration

EMT-Intermediate: National Standard Curriculum

- 1. "Right" patient
- 2. "Right" drug
- 3. "Right" dose
- 4. "Right" route
- 5. "Right" time
- 6. "Right" documentation
- VI. Medical asepsis
 - A. Clean technique versus sterile technique
 - B. Sterilization
 - C. Antiseptics
 - D. Disinfectants
- VII. Universal precautions and body substance isolation (BSI) in medication administration
- VIII. Venous access
 - A. Peripheral intravenous cannulation
 - 1. General principles
 - 2. Indications
 - 3. Precautions
 - 4. Equipment
 - 5. Technique
 - a. Extremity
 - (1) Indications
 - (2) Precautions
 - (3) Equipment
 - (4) Procedure
 - b. External jugular
 - (1) Indications
 - (2) Precautions
 - (3) Equipment
 - (4) Procedure
 - B. Intraosseous needle placement and infusion
 - General principles
 - 2. Indications
 - 3. Precautions
 - 4. Equipment
 - 5. Technique
- IX. Medications administered by the inhalation route
 - A. Bronchodilator (beta agonist) medications
 - 1. Other medications
 - B. Equipment
 - 1. Oxygen or compressed air source
 - 2. Small volume nebulizer (SVN)
 - a. Other inhaler equipment
 - b. Other adapter equipment
 - c. Modified inhaler equipment
 - C. Administering medications by the inhalation route

 $S_{1}, S_{1}, S_{2}, S_{3}, S_{4}, S_{5}, S_{6}, S_{7}, S_{7},$

United States Department of Transportation

National Highway Traffic Safety Administration

- Indications
- 2. Techniques
- 3. Precautions
- 4. General principles for administering medications by the inhalation route
- X. Enteral medication administration
 - A. Oral administration of medications
 - Dosage forms of solid-form and liquid-form oral medications
 - a. Capsules
 - b. Time-released capsules
 - c. Lozenges
 - d. Pills
 - e. Tablets
 - f. Elixirs
 - g. Emulsions
 - h. Suspensions
 - i. Syrups
 - 2. Equipment
 - a. Souffle cup
 - b. Medicine cup
 - c. Medicine dropper
 - d. Teaspoons
 - e. Oral syringes
 - f. Nipples
 - 3. General principles for administration of solid-form and liquid-form oral medications
 - B. Rectal administration of medications
 - 1. Indications for rectal administration of medications
 - 2. Required equipment
 - 3. Techniques utilized
 - 4. Precautions
 - 5. General principles for rectal administration of medications
- XI. Parenteral administration of medications
 - A. Parenteral routes used by EMT-Intermediates
 - 1. Subcutaneous
 - 2. Intramuscular
 - 3. Intravenous bolus
 - 4. Intraosseous
 - Sublingual
 - B. Reasons for parenteral administration of medications
 - C. Equipment used in parenteral administration of medications
 - Syringes
 - a. Calibration of the syringe
 - b. Prefilled syringes
 - 2. Needles
 - a. Parts of the needle
 - 3. Selection of the syringe and needle
 - 4. Packaging of syringes and needles
 - 5. Packaging of parenteral medications
 - a. Ampules

 $S_{1}, S_{2}, S_{3}, S_{4}, S_{5}, S_{5},$

United States Department of Transportation

National Highway Traffic Safety Administration

- b. Vials
- c. Prefilled syringes
- d. Other
- 6. Intravenous (IV) administration sets
 - a. Various types
 - b. Macrodrip chamber-type
 - c. Microdrip chamber-type
 - d. Variety of extensions and other pieces of equipment
 - e. Some IV administration sets are manufacturer specific
- 7. Intravenous (IV) solutions
 - a. Types of containers
 - b. Variety of volumes
- 8. Volume control intravenous set
 - a. Various brands
- D. Preparation of parenteral medication
 - 1. Equipment needed for preparing a parenteral medication
 - 2. Standard procedures for preparing all parenteral medications
 - 3. Guidelines for preparing medications
 - a. Prefilled syringes
 - b. To prepare a medication from an ampule
 - c. Removal of a volume of liquid from a vial
 - d. Preparing a drug from a mix-o-vial
- E. Administration of medication by the subcutaneous route
 - Subcutaneous route injections are made into the loose connective tissue between the dermis and muscle layer
 - 2. Equipment needed for administration of a medication by the subcutaneous route
 - 3. Locate anatomical sites
 - a. Upper arms
 - b. Anterior thighs
 - c. Abdomen
 - d. Sublingual injection
 - 4. Technique for administration of medication by the subcutaneous route
 - Precautions
- F. Administration of medication by the intramuscular route
 - 1. Intramuscular route injections are made by penetrating a needle through the dermis and subcutaneous tissue into the muscle layer
 - 2. Equipment needed for administration of a medication by the intramuscular route
 - 3. Locate anatomical sites for adults and children
 - a. Vastus lateralis muscle
 - b. Rectus femoris muscle
 - c. Gluteal area
 - d. Deltoid muscle
 - 4. Technique for administration of medication by the intramuscular route
 - 5. Precautions
- G. Administration of medication by intravenous bolus
 - Intravenous route
 - a. Places the drug directly into the bloodstream
 - b. Bypasses all barriers to drug absorption
 - 2. Drugs are administered by direct injection with a needle and syringe into an established peripheral IV line

United States Department of Transportation National Highway Traffic Safety Administration

EMT-Intermediate: National Standard Curriculum

- 3. Dosage forms for IV administration
- 4. General principles of IV medication administration
- 5. Steps in performing administration of medications into an established IV line
- 6. Steps in performing administration of medication by a heparin lock
- 7. Steps in changing to the next container of IV solution
- 8. Steps in administering medication by a venous access device
 - a. Equipment
 - b. Technique
- 9. Complications
 - a. Phlebitis or infection
 - b. Extravasation
 - c. Air in tubing
 - d. Circulatory overload and pulmonary edema
 - e. Allergic reaction
 - f. Pulmonary embolism
 - g. Failure to infuse properly
- H. Administration of medication by the intraosseous route
 - 1. Any IV solution or drug that can be administered by the intraosseous route
 - 2. Purpose for the intraosseous route
 - a. Shock
 - b. Status epilepticus
 - c. Other conditions
 - 3. Equipment needed
 - 4. Anatomical sites
 - 5. General principles of administering an IV solution or medication administration via the intraosseous route
 - 6. Steps in performing administration of medications by the intraosseous route
 - a. Need for injection of medication with saline flush
 - b. Need for administration of fluids
 - 7. Complications
 - a. Phlebitis or infection
 - b. Extravasation
 - c. Compartment syndrome
 - d. Fracture
 - e. Air embolism due to air in tubing
 - f. Pulmonary embolism due to marrow particles (bone and fat)
 - g. Circulatory overload and pulmonary edema
 - h. Allergic reaction
 - i. Failure to flush the intraosseous needle
 - j. Failure to infuse properly
- I. Administering medications by the sublingual route
 - . Places where medications are commonly applied
 - a. Under the tongue (sublingual)
 - b. Against the cheek (buccal)
 - c. Dosage forms
 - (1) Tablets
 - (2) Liquid/Spray
- XII. Obtaining a blood sample
 - A. Purposes for obtaining a blood sample

United States Department of Transportation

National Highway Traffic Safety Administration

- B. Equipment needed for obtaining a blood sample
- C. Locations from which to obtain a blood sample
 - Anatomical sites
 - 2. From the established intravenous catheter
 - 3. Other locations
- D. Steps to preparing equipment for obtaining a blood sample
- E. Techniques for obtaining a blood sample
- F. Complications
- XIII. Disposal of contaminated items and sharps
 - A. Follow local protocol for disposal of contaminated items and sharps